

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P1437768

Luminaire Tested: **GALN-SB5D-835-U-T3LG-HSS**

Issue Date: 03/27/202

This test was performed under the Supervised Manufacturer's Testing Program. The results of this test have not been influenced by sources from within Cooper Lighting Solutions or from external interests.

Report Generated By 670245763



**Test Information**

Test Method: LM-79-08  
Report Number: P1437768  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 03/27/202  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GALN-SB5D-835-U-T3LG-HSS  
Description: GALLEON II AREA AND ROADWAY HIGH DENSITY LUMINAIRE 900mA 5xLight Square PACKAGE 80CRI 3500K FIXTURE w/ TYPE III LOW GLARE WITH HOUSE SIDE SHIELD  
Light Source: (130) 3500K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER  
Luminaire Equipment: 

| <u>Sample No.</u> | <u>Condition</u> | <u>Description</u> |
|-------------------|------------------|--------------------|
| a                 | good             | reflector          |
| b                 | good             | lens               |
| c                 | good             | housing            |
| d                 | good             | cord               |

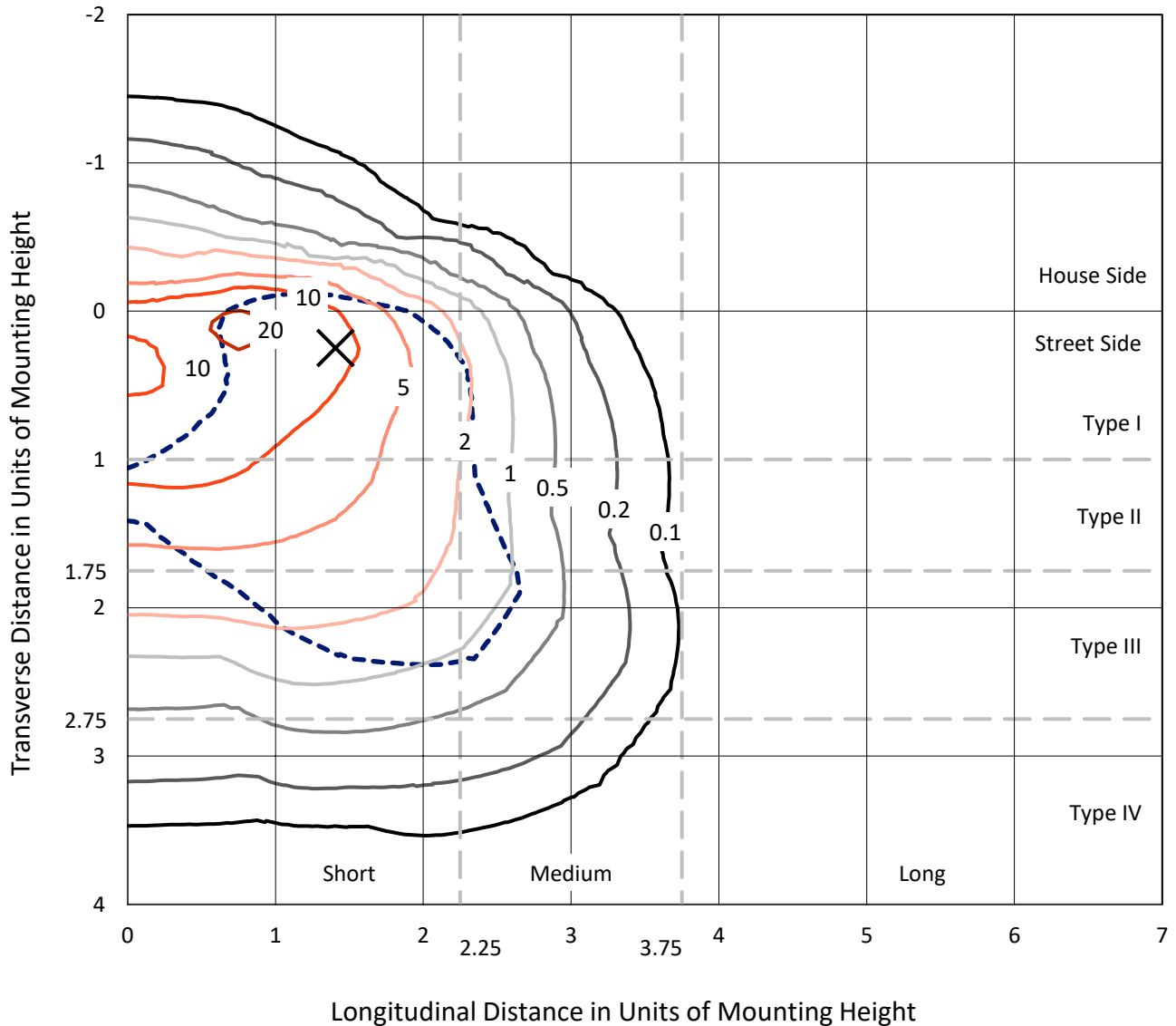
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 36453.3 lumens  
Efficiency: N/A  
Efficacy: 99.9 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B3 - U0 - G4  
  
Input Watts (W): 364.9  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.97  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

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### Iso-Footcandle Lines of Horizontal Illumination

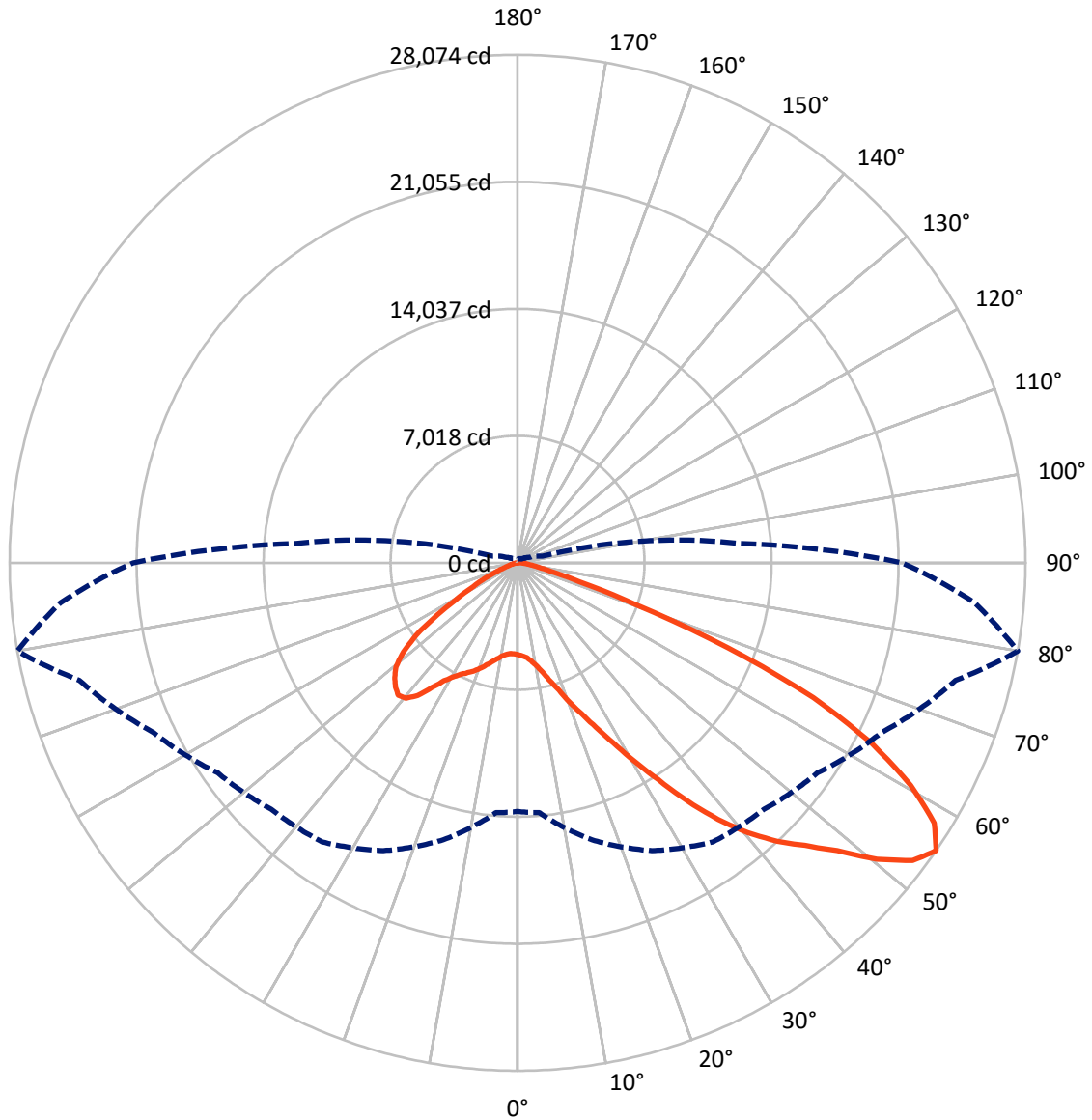
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 22.5 fc  
 Type III - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 80-Deg Lateral      - - - Horizontal Cone Through 55-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4431.3   | 0.0    | 4431.3  |
|                    | % Fixture | 12.2     | 0.0    | 12.2    |
| <b>Street Side</b> | Lumens    | 32022.0  | 0.0    | 32022.0 |
|                    | % Fixture | 87.8     | 0.0    | 87.8    |
| <b>Total</b>       | Lumens    | 36453.3  | 0.0    | 36453.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 426.1   | 1.2       |
| 10°-20°   | 1123.5  | 3.1       |
| 20°-30°   | 2199.4  | 6.0       |
| 30°-40°   | 4474.5  | 12.3      |
| 40°-50°   | 7543.4  | 20.7      |
| 50°-60°   | 9638.2  | 26.4      |
| 60°-70°   | 8228.7  | 22.6      |
| 70°-80°   | 2629.6  | 7.2       |
| 80°-90°   | 189.9   | 0.5       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 36453.3 | 100.0     |
| 0°-180°   | 36453.3 | 100.0     |

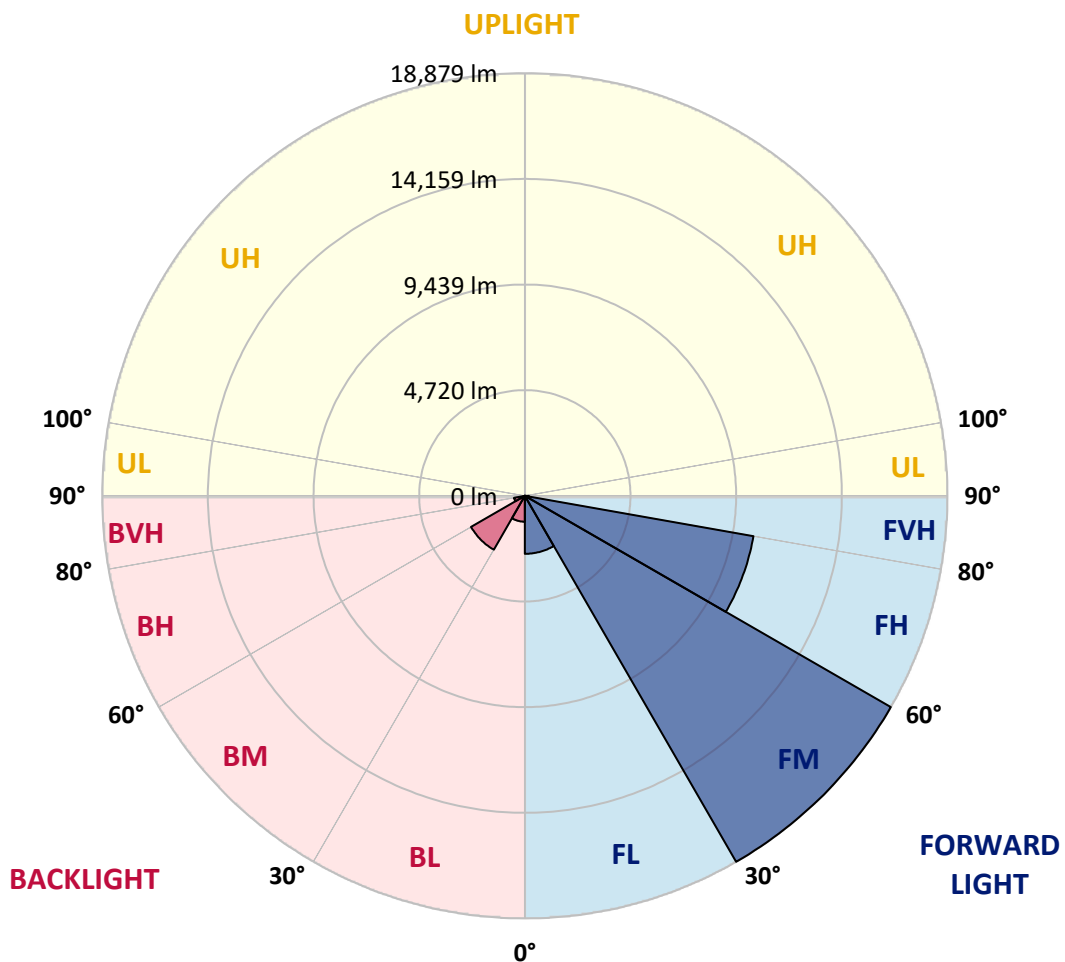


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|----------------|---------|-----------|-------------------------|------|----------|
|                |         |           | B                       | U    | G        |
| FL (0°-30°)    | 2591.9  | 7.1       |                         |      |          |
| FM (30°-60°)   | 18878.9 | 51.8      |                         |      |          |
| FH (60°-80°)   | 10371.3 | 28.5      |                         |      | G4/12000 |
| FVH (80°-90°)  | 180.0   | 0.5       |                         |      | G2/225   |
| BL (0°-30°)    | 1157.1  | 3.2       | B3/2500                 |      |          |
| BM (30°-60°)   | 2777.2  | 7.6       | B3/5000                 |      |          |
| BH (60°-80°)   | 487.0   | 1.3       | B1/500                  |      | G1/500   |
| BVH (80°-90°)  | 9.9     | 0.0       |                         |      | G0/10    |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**  
 Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 80°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 5077.9  | 5077.9  | 5077.9  | 5077.9  | 5077.9  | 5077.9  | 5077.9  | 5077.9  | 5077.9  | 5077.9  | 5077.9  |
| 2.5°  | 5109.0  | 5119.3  | 5109.0  | 5119.3  | 5140.1  | 5129.7  | 5171.2  | 5160.8  | 5160.8  | 5150.4  | 5109.0  |
| 5°    | 4818.8  | 4829.2  | 4849.9  | 4901.7  | 4974.3  | 5046.8  | 5140.1  | 5202.2  | 5264.4  | 5254.1  | 5212.6  |
| 7.5°  | 4248.8  | 4269.6  | 4352.5  | 4456.1  | 4694.5  | 4912.1  | 5150.4  | 5305.9  | 5440.6  | 5482.0  | 5451.0  |
| 10°   | 3927.6  | 3948.3  | 4000.1  | 4103.8  | 4321.4  | 4684.1  | 5150.4  | 5471.7  | 5710.0  | 5792.9  | 5803.3  |
| 12.5° | 3896.5  | 3906.9  | 3948.3  | 4062.3  | 4248.8  | 4559.7  | 5140.1  | 5689.3  | 6093.5  | 6217.8  | 6259.3  |
| 15°   | 3917.2  | 3938.0  | 3979.4  | 4072.7  | 4290.3  | 4642.6  | 5223.0  | 6031.3  | 6601.3  | 6777.4  | 6787.8  |
| 17.5° | 4000.1  | 4020.9  | 4072.7  | 4176.3  | 4414.7  | 4860.3  | 5482.0  | 6383.6  | 7212.7  | 7409.6  | 7523.6  |
| 20°   | 4165.9  | 4176.3  | 4238.5  | 4373.2  | 4642.6  | 5129.7  | 5865.5  | 6860.3  | 7948.4  | 8238.6  | 8321.5  |
| 22.5° | 4383.6  | 4414.7  | 4497.6  | 4663.4  | 5005.3  | 5502.8  | 6394.0  | 7440.7  | 8756.8  | 9057.3  | 9202.4  |
| 25°   | 4621.9  | 4663.4  | 4787.7  | 5057.2  | 5492.4  | 6072.7  | 7046.9  | 8207.5  | 9710.2  | 10072.9 | 10269.8 |
| 27.5° | 5109.0  | 5119.3  | 5202.2  | 5544.2  | 6103.8  | 6818.9  | 7875.9  | 9192.0  | 10829.4 | 11254.3 | 11471.9 |
| 30°   | 6176.4  | 6186.7  | 6114.2  | 6207.5  | 6777.4  | 7699.7  | 8850.0  | 10342.3 | 12135.1 | 12725.8 | 12902.0 |
| 32.5° | 7482.1  | 7533.9  | 7523.6  | 7461.4  | 7720.5  | 8580.6  | 10010.7 | 11720.6 | 13668.8 | 14290.6 | 14456.4 |
| 35°   | 8964.0  | 9088.4  | 9057.3  | 9036.6  | 9067.7  | 9710.2  | 11337.2 | 13244.0 | 15409.8 | 16166.3 | 16301.1 |
| 37.5° | 10414.8 | 10445.9 | 10591.0 | 10767.2 | 10787.9 | 11233.5 | 12870.9 | 14860.6 | 17026.5 | 17990.2 | 18197.5 |
| 40°   | 11534.1 | 11637.7 | 12000.4 | 12352.7 | 12715.4 | 13067.8 | 14135.2 | 16166.3 | 18311.5 | 19606.9 | 19700.1 |
| 42.5° | 12404.6 | 12653.3 | 13181.8 | 13731.0 | 14466.8 | 14860.6 | 15337.3 | 17088.6 | 19358.1 | 21047.3 | 21005.9 |
| 45°   | 13461.6 | 13565.2 | 14311.4 | 15036.8 | 15782.9 | 16384.0 | 16373.6 | 17865.9 | 20176.8 | 22280.5 | 22021.4 |
| 47.5° | 14176.6 | 14301.0 | 15316.6 | 16166.3 | 16933.2 | 17233.7 | 17295.9 | 18705.3 | 21306.4 | 23772.8 | 23161.4 |
| 50°   | 14560.1 | 14777.7 | 15886.5 | 16964.3 | 17793.3 | 17886.6 | 18166.4 | 19803.8 | 22788.3 | 25752.1 | 24601.8 |
| 52.5° | 14601.5 | 14808.8 | 16083.4 | 17472.1 | 18373.7 | 18560.2 | 19036.9 | 21047.3 | 24228.8 | 27337.7 | 25430.9 |
| 55°   | 13741.4 | 13865.7 | 15845.1 | 17555.0 | 18829.6 | 19264.9 | 20239.0 | 22197.6 | 25068.2 | 28073.5 | 25358.3 |
| 57.5° | 12933.1 | 13057.4 | 14777.7 | 17409.9 | 19296.0 | 20187.2 | 21524.0 | 22985.2 | 24415.3 | 27161.5 | 23741.7 |
| 60°   | 12238.7 | 12300.9 | 13865.7 | 16736.3 | 19472.1 | 21088.8 | 22632.9 | 22208.0 | 22726.1 | 24974.9 | 20974.8 |
| 62.5° | 10933.0 | 10974.5 | 12829.4 | 15523.8 | 19119.8 | 21783.1 | 23016.3 | 20560.3 | 20871.2 | 21959.3 | 17720.8 |
| 65°   | 8259.3  | 8414.8  | 10114.3 | 14611.9 | 18539.5 | 22104.4 | 22125.1 | 18549.8 | 18228.6 | 17969.5 | 13938.3 |
| 67.5° | 5606.4  | 5782.6  | 6808.5  | 13140.3 | 17596.4 | 22239.1 | 20394.5 | 15948.7 | 13886.5 | 12549.6 | 9129.8  |
| 70°   | 4476.8  | 4476.8  | 4829.2  | 10559.9 | 15358.0 | 20518.8 | 18249.3 | 12041.8 | 8818.9  | 6932.9  | 4891.4  |
| 72.5° | 2943.1  | 2953.5  | 3285.1  | 6704.9  | 10891.5 | 15648.2 | 14881.3 | 6964.0  | 4580.5  | 3533.8  | 2414.6  |
| 75°   | 1067.4  | 1067.4  | 1440.5  | 2684.0  | 5761.8  | 9316.4  | 9067.7  | 3326.5  | 2487.1  | 1927.5  | 1461.2  |
| 77.5° | 570.0   | 590.7   | 694.3   | 1108.8  | 2207.3  | 3792.9  | 3544.2  | 1699.5  | 1409.4  | 1202.1  | 911.9   |
| 80°   | 383.4   | 393.8   | 466.3   | 684.0   | 1067.4  | 1461.2  | 1139.9  | 953.4   | 953.4   | 808.3   | 611.4   |
| 82.5° | 207.3   | 217.6   | 310.9   | 445.6   | 570.0   | 684.0   | 549.2   | 559.6   | 673.6   | 549.2   | 352.3   |
| 85°   | 145.1   | 145.1   | 238.3   | 321.3   | 321.3   | 331.6   | 238.3   | 352.3   | 393.8   | 342.0   | 238.3   |
| 87.5° | 82.9    | 82.9    | 134.7   | 155.4   | 155.4   | 145.1   | 72.5    | 124.4   | 155.4   | 176.2   | 103.6   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P1437768

CATALOG NUMBER: GALN-SB5D-835-U-T3LG-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5077.9  | 5077.9  | 5077.9 | 5077.9 | 5077.9 | 5077.9 | 5077.9 | 5077.9 | 5077.9 | 5077.9 | 5077.9 |
| 2.5°  | 5098.6  | 5067.5  | 5005.3 | 4881.0 | 4818.8 | 4735.9 | 4663.4 | 4570.1 | 4549.4 | 4539.0 | 4497.6 |
| 5°    | 5181.5  | 5119.3  | 4932.8 | 4663.4 | 4435.4 | 4217.8 | 4000.1 | 3875.8 | 3772.1 | 3720.3 | 3710.0 |
| 7.5°  | 5388.8  | 5264.4  | 4922.4 | 4445.7 | 4020.9 | 3647.8 | 3326.5 | 3046.7 | 2901.6 | 2777.3 | 2787.7 |
| 10°   | 5699.7  | 5502.8  | 4943.2 | 4238.5 | 3606.3 | 3005.3 | 2538.9 | 2134.8 | 1844.6 | 1709.9 | 1699.5 |
| 12.5° | 6114.2  | 5834.4  | 5015.7 | 4031.2 | 3098.5 | 2259.1 | 1668.4 | 1430.1 | 1367.9 | 1357.6 | 1347.2 |
| 15°   | 6622.0  | 6228.2  | 5088.2 | 3761.8 | 2414.6 | 1564.8 | 1357.6 | 1305.7 | 1295.4 | 1285.0 | 1285.0 |
| 17.5° | 7233.4  | 6684.2  | 5129.7 | 3305.8 | 1761.7 | 1347.2 | 1274.7 | 1243.6 | 1233.2 | 1222.8 | 1222.8 |
| 20°   | 8000.3  | 7191.9  | 5181.5 | 2725.5 | 1492.3 | 1295.4 | 1212.5 | 1171.0 | 1160.7 | 1160.7 | 1150.3 |
| 22.5° | 8756.8  | 7761.9  | 5140.1 | 2217.7 | 1440.5 | 1233.2 | 1139.9 | 1098.5 | 1077.8 | 1077.8 | 1067.4 |
| 25°   | 9627.3  | 8342.2  | 5015.7 | 2000.1 | 1430.1 | 1181.4 | 1067.4 | 1005.2 | 974.1  | 963.8  | 963.8  |
| 27.5° | 10622.1 | 9005.5  | 4818.8 | 2010.4 | 1430.1 | 1139.9 | 974.1  | 891.2  | 870.5  | 849.8  | 849.8  |
| 30°   | 11762.0 | 9813.8  | 4673.7 | 2145.1 | 1450.8 | 1098.5 | 891.2  | 787.6  | 756.5  | 735.8  | 746.1  |
| 32.5° | 13067.8 | 10715.4 | 4663.4 | 2362.8 | 1481.9 | 1036.3 | 798.0  | 684.0  | 652.9  | 642.5  | 652.9  |
| 35°   | 14549.7 | 11834.6 | 4901.7 | 2528.6 | 1399.0 | 901.6  | 684.0  | 590.7  | 559.6  | 559.6  | 570.0  |
| 37.5° | 16197.4 | 13119.6 | 5223.0 | 2487.1 | 1129.6 | 715.0  | 590.7  | 518.2  | 487.1  | 497.4  | 507.8  |
| 40°   | 17700.1 | 14124.8 | 5274.8 | 2124.4 | 849.8  | 611.4  | 507.8  | 456.0  | 435.2  | 445.6  | 456.0  |
| 42.5° | 18840.0 | 14933.1 | 4777.4 | 1647.7 | 715.0  | 518.2  | 435.2  | 393.8  | 383.4  | 404.2  | 404.2  |
| 45°   | 19762.3 | 15254.4 | 3989.8 | 1222.8 | 632.1  | 445.6  | 383.4  | 362.7  | 342.0  | 352.3  | 352.3  |
| 47.5° | 20726.1 | 15306.2 | 3254.0 | 984.5  | 559.6  | 404.2  | 352.3  | 331.6  | 310.9  | 310.9  | 310.9  |
| 50°   | 21658.7 | 15181.8 | 2487.1 | 870.5  | 518.2  | 362.7  | 321.3  | 300.5  | 279.8  | 269.4  | 269.4  |
| 52.5° | 21886.7 | 14187.0 | 1823.9 | 808.3  | 476.7  | 342.0  | 300.5  | 279.8  | 259.1  | 248.7  | 248.7  |
| 55°   | 21254.6 | 12300.9 | 1430.1 | 725.4  | 435.2  | 310.9  | 279.8  | 259.1  | 228.0  | 217.6  | 217.6  |
| 57.5° | 19171.6 | 9378.5  | 1139.9 | 621.8  | 393.8  | 300.5  | 259.1  | 238.3  | 207.3  | 196.9  | 196.9  |
| 60°   | 16466.9 | 6653.1  | 922.3  | 507.8  | 362.7  | 269.4  | 238.3  | 207.3  | 186.5  | 165.8  | 165.8  |
| 62.5° | 13471.9 | 4777.4  | 746.1  | 424.9  | 342.0  | 238.3  | 217.6  | 186.5  | 145.1  | 114.0  | 114.0  |
| 65°   | 10331.9 | 3430.2  | 580.3  | 342.0  | 310.9  | 207.3  | 186.5  | 155.4  | 114.0  | 82.9   | 82.9   |
| 67.5° | 6684.2  | 2217.7  | 435.2  | 300.5  | 238.3  | 176.2  | 145.1  | 124.4  | 103.6  | 72.5   | 62.2   |
| 70°   | 3523.4  | 1295.4  | 321.3  | 259.1  | 176.2  | 134.7  | 124.4  | 103.6  | 82.9   | 51.8   | 51.8   |
| 72.5° | 1823.9  | 849.8   | 238.3  | 228.0  | 134.7  | 93.3   | 103.6  | 82.9   | 62.2   | 31.1   | 31.1   |
| 75°   | 1171.0  | 570.0   | 176.2  | 186.5  | 82.9   | 72.5   | 72.5   | 51.8   | 31.1   | 20.7   | 10.4   |
| 77.5° | 756.5   | 383.4   | 124.4  | 155.4  | 51.8   | 41.5   | 41.5   | 20.7   | 10.4   | 0.0    | 0.0    |
| 80°   | 445.6   | 238.3   | 82.9   | 103.6  | 20.7   | 20.7   | 10.4   | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 228.0   | 124.4   | 41.5   | 41.5   | 10.4   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 145.1   | 62.2    | 10.4   | 10.4   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 72.5    | 20.7    | 10.4   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP1-2407-184-10

Test Date: 10/11/2024

Luminaire Tested: GSS-SB1A-835-U-5WQ

Data in this report applies to families of products including GSS-SB1A-835-U-5WQ

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-10  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GSS-SB1A-835-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 80 CRI 3500K CCT 26 LEDS

**Spectral Parameters**

CCT (K): 3411  
 CIE u': 0.2360  
 CIE v': 0.5189  
 Duv: 0.0044  
 CIE x: 0.4154  
 CIE y: 0.4059  
 CIE z: 0.1787  
 Peak Wavelength (nm): 601  
 Dominant Wavelength (nm): 579  
 Purity: 46.51914  
 Rf: 86.6  
 Rg: 95.9

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 83.5 |      |      |
| R1:       | 81.1 | R9:  | 6.3  |
| R2:       | 88.9 | R10: | 75.4 |
| R3:       | 97.2 | R11: | 84.1 |
| R4:       | 83.8 | R12: | 69.7 |
| R5:       | 81.7 | R13: | 82.8 |
| R6:       | 86.9 | R14: | 98.5 |
| R7:       | 86.1 | R15: | 72.6 |
| R8:       | 62.2 |      |      |



**Test Conditions**

Stabilization Time: 35M  
 Operation Time: 1H 35M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-10

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

REPORT NUMBER: SP1-2407-184-10

CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3500K 7-step quadrangle

REPORT NUMBER: SP1-2407-184-10

**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) |
|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|
| 360            | 0                        | NR                   | 490            | 311                      | NR                   | 620            | 903                      | NR                   | 750            | 26                       | NR                   | 880            | 1                        | NR                   |
| 365            | 0                        | NR                   | 495            | 376                      | NR                   | 625            | 851                      | NR                   | 755            | 22                       | NR                   | 885            | 1                        | NR                   |
| 370            | 0                        | NR                   | 500            | 438                      | NR                   | 630            | 797                      | NR                   | 760            | 19                       | NR                   | 890            | 0                        | NR                   |
| 375            | 0                        | NR                   | 505            | 491                      | NR                   | 635            | 735                      | NR                   | 765            | 16                       | NR                   | 895            | 0                        | NR                   |
| 380            | 0                        | NR                   | 510            | 533                      | NR                   | 640            | 672                      | NR                   | 770            | 14                       | NR                   | 900            | 0                        | NR                   |
| 385            | 0                        | NR                   | 515            | 566                      | NR                   | 645            | 607                      | NR                   | 775            | 12                       | NR                   | 905            | 0                        | NR                   |
| 390            | 0                        | NR                   | 520            | 592                      | NR                   | 650            | 546                      | NR                   | 780            | 10                       | NR                   | 910            | 0                        | NR                   |
| 395            | 1                        | NR                   | 525            | 608                      | NR                   | 655            | 487                      | NR                   | 785            | 9                        | NR                   | 915            | 0                        | NR                   |
| 400            | 3                        | NR                   | 530            | 625                      | NR                   | 660            | 429                      | NR                   | 790            | 7                        | NR                   | 920            | 0                        | NR                   |
| 405            | 6                        | NR                   | 535            | 642                      | NR                   | 665            | 378                      | NR                   | 795            | 6                        | NR                   | 925            | 0                        | NR                   |
| 410            | 12                       | NR                   | 540            | 657                      | NR                   | 670            | 329                      | NR                   | 800            | 5                        | NR                   | 930            | 0                        | NR                   |
| 415            | 22                       | NR                   | 545            | 677                      | NR                   | 675            | 286                      | NR                   | 805            | 5                        | NR                   | 935            | 0                        | NR                   |
| 420            | 43                       | NR                   | 550            | 701                      | NR                   | 680            | 248                      | NR                   | 810            | 4                        | NR                   | 940            | 0                        | NR                   |
| 425            | 80                       | NR                   | 555            | 728                      | NR                   | 685            | 213                      | NR                   | 815            | 3                        | NR                   | 945            | 0                        | NR                   |
| 430            | 140                      | NR                   | 560            | 757                      | NR                   | 690            | 184                      | NR                   | 820            | 3                        | NR                   | 950            | 0                        | NR                   |
| 435            | 243                      | NR                   | 565            | 793                      | NR                   | 695            | 156                      | NR                   | 825            | 3                        | NR                   | 955            | 0                        | NR                   |
| 440            | 412                      | NR                   | 570            | 831                      | NR                   | 700            | 134                      | NR                   | 830            | 2                        | NR                   | 960            | 0                        | NR                   |
| 445            | 610                      | NR                   | 575            | 872                      | NR                   | 705            | 114                      | NR                   | 835            | 2                        | NR                   | 965            | 0                        | NR                   |
| 450            | 597                      | NR                   | 580            | 911                      | NR                   | 710            | 97                       | NR                   | 840            | 2                        | NR                   | 970            | 0                        | NR                   |
| 455            | 412                      | NR                   | 585            | 944                      | NR                   | 715            | 83                       | NR                   | 845            | 1                        | NR                   | 975            | 0                        | NR                   |
| 460            | 330                      | NR                   | 590            | 974                      | NR                   | 720            | 70                       | NR                   | 850            | 1                        | NR                   | 980            | 0                        | NR                   |
| 465            | 274                      | NR                   | 595            | 992                      | NR                   | 725            | 60                       | NR                   | 855            | 1                        | NR                   | 985            | 0                        | NR                   |
| 470            | 211                      | NR                   | 600            | 999                      | NR                   | 730            | 51                       | NR                   | 860            | 1                        | NR                   | 990            | 0                        | NR                   |
| 475            | 200                      | NR                   | 605            | 992                      | NR                   | 735            | 43                       | NR                   | 865            | 1                        | NR                   | 995            | 0                        | NR                   |
| 480            | 220                      | NR                   | 610            | 975                      | NR                   | 740            | 36                       | NR                   | 870            | 1                        | NR                   | 1000           | 0                        | NR                   |
| 485            | 255                      | NR                   | 615            | 944                      | NR                   | 745            | 31                       | NR                   | 875            | 1                        | NR                   |                |                          |                      |

REPORT NUMBER: SP1-2407-184-10

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.48**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 311                         | NR                      | 620               | 903                         | NR                      | 750               | 26                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 376                         | NR                      | 625               | 851                         | NR                      | 755               | 22                          | NR                      | 885               | 1                           | NR                      |
| 370               | 0                           | NR                      | 500               | 438                         | NR                      | 630               | 797                         | NR                      | 760               | 19                          | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 491                         | NR                      | 635               | 735                         | NR                      | 765               | 16                          | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 533                         | NR                      | 640               | 672                         | NR                      | 770               | 14                          | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 566                         | NR                      | 645               | 607                         | NR                      | 775               | 12                          | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 592                         | NR                      | 650               | 546                         | NR                      | 780               | 10                          | NR                      | 910               | 0                           | NR                      |
| 395               | 1                           | NR                      | 525               | 608                         | NR                      | 655               | 487                         | NR                      | 785               | 9                           | NR                      | 915               | 0                           | NR                      |
| 400               | 3                           | NR                      | 530               | 625                         | NR                      | 660               | 429                         | NR                      | 790               | 7                           | NR                      | 920               | 0                           | NR                      |
| 405               | 6                           | NR                      | 535               | 642                         | NR                      | 665               | 378                         | NR                      | 795               | 6                           | NR                      | 925               | 0                           | NR                      |
| 410               | 12                          | NR                      | 540               | 657                         | NR                      | 670               | 329                         | NR                      | 800               | 5                           | NR                      | 930               | 0                           | NR                      |
| 415               | 22                          | NR                      | 545               | 677                         | NR                      | 675               | 286                         | NR                      | 805               | 5                           | NR                      | 935               | 0                           | NR                      |
| 420               | 43                          | NR                      | 550               | 701                         | NR                      | 680               | 248                         | NR                      | 810               | 4                           | NR                      | 940               | 0                           | NR                      |
| 425               | 80                          | NR                      | 555               | 728                         | NR                      | 685               | 213                         | NR                      | 815               | 3                           | NR                      | 945               | 0                           | NR                      |
| 430               | 140                         | NR                      | 560               | 757                         | NR                      | 690               | 184                         | NR                      | 820               | 3                           | NR                      | 950               | 0                           | NR                      |
| 435               | 243                         | NR                      | 565               | 793                         | NR                      | 695               | 156                         | NR                      | 825               | 3                           | NR                      | 955               | 0                           | NR                      |
| 440               | 412                         | NR                      | 570               | 831                         | NR                      | 700               | 134                         | NR                      | 830               | 2                           | NR                      | 960               | 0                           | NR                      |
| 445               | 610                         | NR                      | 575               | 872                         | NR                      | 705               | 114                         | NR                      | 835               | 2                           | NR                      | 965               | 0                           | NR                      |
| 450               | 597                         | NR                      | 580               | 911                         | NR                      | 710               | 97                          | NR                      | 840               | 2                           | NR                      | 970               | 0                           | NR                      |
| 455               | 412                         | NR                      | 585               | 944                         | NR                      | 715               | 83                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 330                         | NR                      | 590               | 974                         | NR                      | 720               | 70                          | NR                      | 850               | 1                           | NR                      | 980               | 0                           | NR                      |
| 465               | 274                         | NR                      | 595               | 992                         | NR                      | 725               | 60                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 211                         | NR                      | 600               | 999                         | NR                      | 730               | 51                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 200                         | NR                      | 605               | 992                         | NR                      | 735               | 43                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 220                         | NR                      | 610               | 975                         | NR                      | 740               | 36                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 255                         | NR                      | 615               | 944                         | NR                      | 745               | 31                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

REPORT NUMBER: SP1-2407-184-10

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.88

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 311                      | NR            | 620    | 903                      | NR            | 750    | 26                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 376                      | NR            | 625    | 851                      | NR            | 755    | 22                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 438                      | NR            | 630    | 797                      | NR            | 760    | 19                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 491                      | NR            | 635    | 735                      | NR            | 765    | 16                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 533                      | NR            | 640    | 672                      | NR            | 770    | 14                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 566                      | NR            | 645    | 607                      | NR            | 775    | 12                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 592                      | NR            | 650    | 546                      | NR            | 780    | 10                       | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 608                      | NR            | 655    | 487                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 625                      | NR            | 660    | 429                      | NR            | 790    | 7                        | NR            | 920    | 0                        | NR            |
| 405    | 6                        | NR            | 535    | 642                      | NR            | 665    | 378                      | NR            | 795    | 6                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 657                      | NR            | 670    | 329                      | NR            | 800    | 5                        | NR            | 930    | 0                        | NR            |
| 415    | 22                       | NR            | 545    | 677                      | NR            | 675    | 286                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 43                       | NR            | 550    | 701                      | NR            | 680    | 248                      | NR            | 810    | 4                        | NR            | 940    | 0                        | NR            |
| 425    | 80                       | NR            | 555    | 728                      | NR            | 685    | 213                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 140                      | NR            | 560    | 757                      | NR            | 690    | 184                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 243                      | NR            | 565    | 793                      | NR            | 695    | 156                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 412                      | NR            | 570    | 831                      | NR            | 700    | 134                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 610                      | NR            | 575    | 872                      | NR            | 705    | 114                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 597                      | NR            | 580    | 911                      | NR            | 710    | 97                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 412                      | NR            | 585    | 944                      | NR            | 715    | 83                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 330                      | NR            | 590    | 974                      | NR            | 720    | 70                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 274                      | NR            | 595    | 992                      | NR            | 725    | 60                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 211                      | NR            | 600    | 999                      | NR            | 730    | 51                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 200                      | NR            | 605    | 992                      | NR            | 735    | 43                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 220                      | NR            | 610    | 975                      | NR            | 740    | 36                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 255                      | NR            | 615    | 944                      | NR            | 745    | 31                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 86.6$   
 $R_g = 95.9$   
 $CIE R_a = 83.5$   
 $R_9 = 6.3$



**Color Vector Graphics**



**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |             |            |            |
|------------|-------------|------------|------------|
| CES01 = 86 | CES26 = 85  | CES51 = 97 | CES76 = 81 |
| CES02 = 62 | CES27 = 95  | CES52 = 96 | CES77 = 87 |
| CES03 = 31 | CES28 = 94  | CES53 = 91 | CES78 = 80 |
| CES04 = 70 | CES29 = 87  | CES54 = 92 | CES79 = 93 |
| CES05 = 49 | CES30 = 93  | CES55 = 92 | CES80 = 91 |
| CES06 = 51 | CES31 = 89  | CES56 = 88 | CES81 = 77 |
| CES07 = 41 | CES32 = 84  | CES57 = 87 | CES82 = 96 |
| CES08 = 40 | CES33 = 91  | CES58 = 88 | CES83 = 95 |
| CES09 = 29 | CES34 = 91  | CES59 = 93 | CES84 = 92 |
| CES10 = 75 | CES35 = 95  | CES60 = 94 | CES85 = 80 |
| CES11 = 58 | CES36 = 90  | CES61 = 91 | CES86 = 72 |
| CES12 = 64 | CES37 = 95  | CES62 = 95 | CES87 = 86 |
| CES13 = 43 | CES38 = 100 | CES63 = 88 | CES88 = 88 |
| CES14 = 74 | CES39 = 97  | CES64 = 85 | CES89 = 77 |
| CES15 = 71 | CES40 = 94  | CES65 = 80 | CES90 = 88 |
| CES16 = 47 | CES41 = 97  | CES66 = 84 | CES91 = 81 |
| CES17 = 49 | CES42 = 96  | CES67 = 82 | CES92 = 67 |
| CES18 = 56 | CES43 = 93  | CES68 = 85 | CES93 = 81 |
| CES19 = 72 | CES44 = 99  | CES69 = 89 | CES94 = 63 |
| CES20 = 66 | CES45 = 95  | CES70 = 81 | CES95 = 76 |
| CES21 = 86 | CES46 = 91  | CES71 = 79 | CES96 = 84 |
| CES22 = 78 | CES47 = 93  | CES72 = 93 | CES97 = 92 |
| CES23 = 91 | CES48 = 85  | CES73 = 76 | CES98 = 86 |
| CES24 = 90 | CES49 = 92  | CES74 = 95 | CES99 = 77 |
| CES25 = 72 | CES50 = 96  | CES75 = 80 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)